

11/791

## Vibration (?) Spikes During Natural Rain Events

David A. Short  
TRMM Office  
NASA/Goddard Space Flight Center  
Greenbelt, Maryland

Limited analysis of ORG data from shipboard and ground based sensors has shown the existence of spikes, possibly attributable to sensor vibration, while rain is occurring. An extreme example of this behavior was noted aboard the PRC#5 on the evening of December 24, 1992 as the ship began repositioning during a rain event (Fig. 1) in the TOGA/COARE IFA. The spikes are readily evident in the one-second resolution data, but may be indistinguishable from natural rain rate fluctuations in sub-sampled or averaged data. Such spikes result in increased rainfall totals.

The PRC#5 ORG data are being re-analyzed to isolate events observed while the ship was drifting from those observed while underway and to examine rain rate statistics for the two subsets.

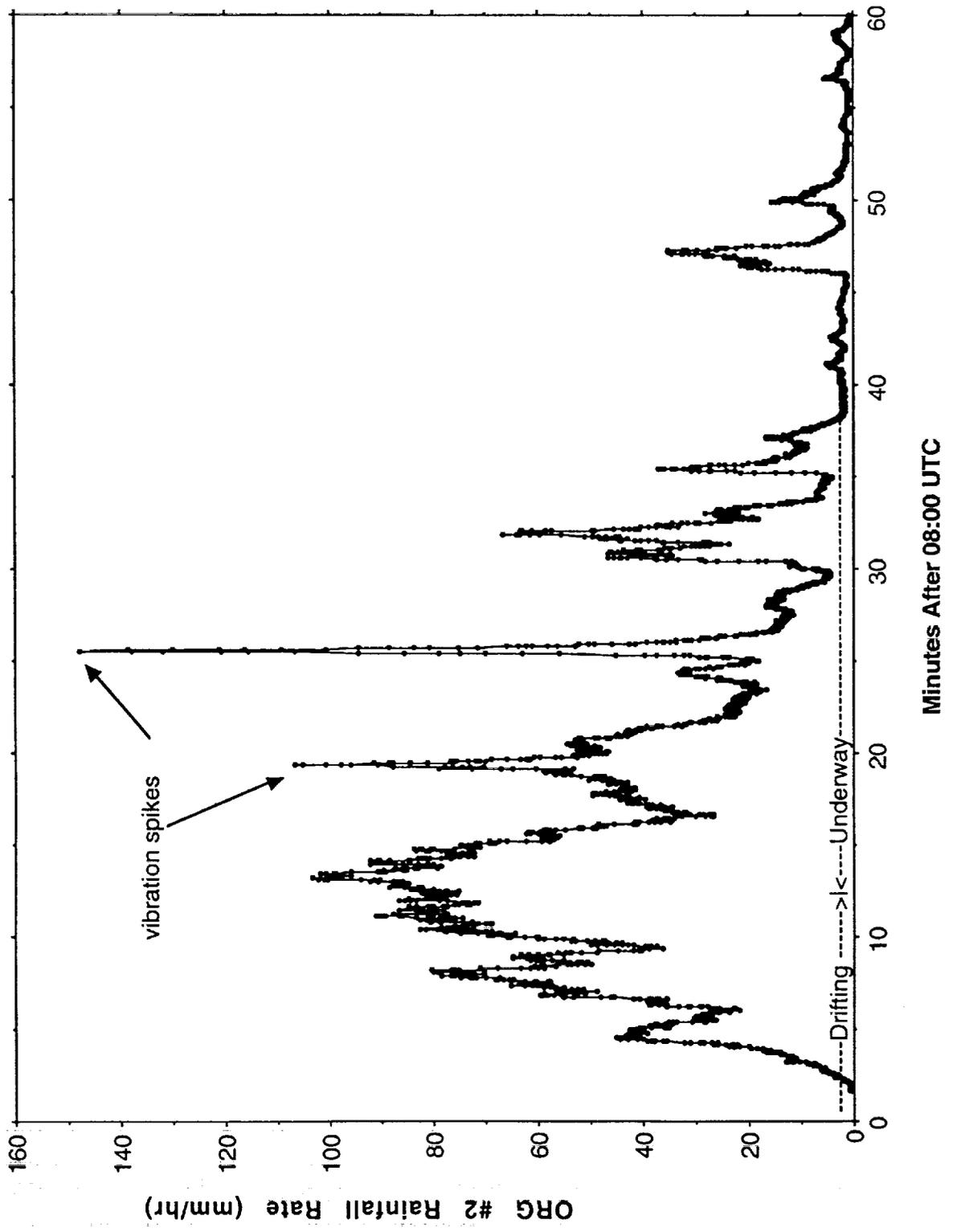
Figure 2 shows another example of spikes reported by the ORG aboard the RV Franklin on November 27, 1992, also during TOGA/COARE. The Franklin data were recorded every 5 seconds.

Such erratic behavior appears to be exceedingly rare when the sensors are land based. However, Fig. 3, showing an inter-comparison of rain rates reported by 6 ORGs at Wallops Flight Facility, indicates that one sensor was reporting rapidly fluctuating, high rainfall rates while the other sensors showed almost nothing. The wind speed was about 10 m/s and all the sensor were mounted on the same platform.

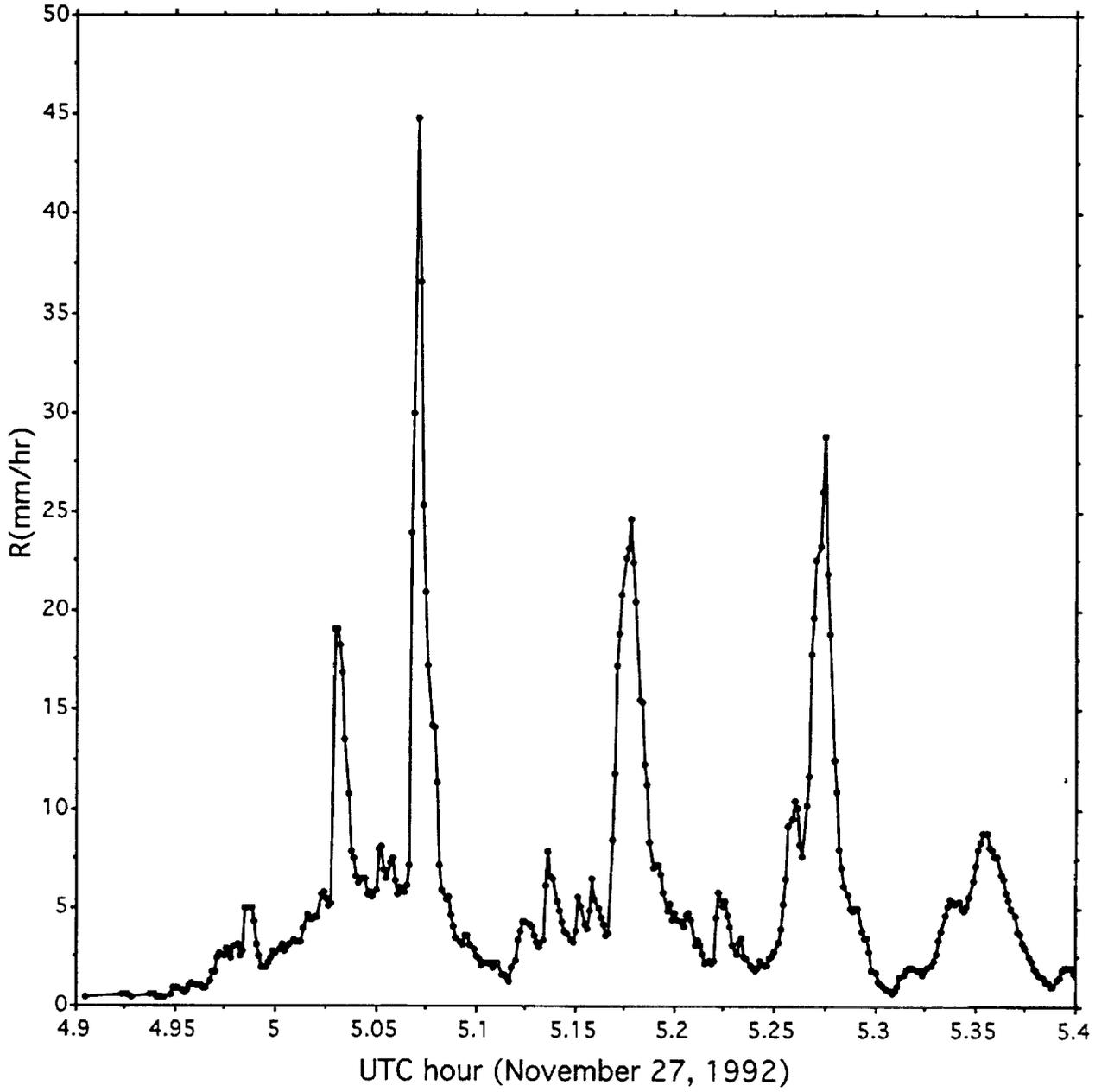
It is not known at this time whether such spikes affect rainfall reports from the ORGs deployed on buoys, as data transmission constraints limit reports to hourly statistics, as computed by an on-board processor.

Pre- and post-COARE calibration studies with land-based ORGs in natural rain have given good indications of reliable performance, with some need for a sensor-dependent, calibration offset, as reported elsewhere during the workshop. Fig. 4 shows a typical example of rain totals from natural rain events recorded by the RV Franklin and PRC#5 ORGs, compared to totals from a precision weighing gauge at the Wallops test facility after the TOGA/COARE IOP.

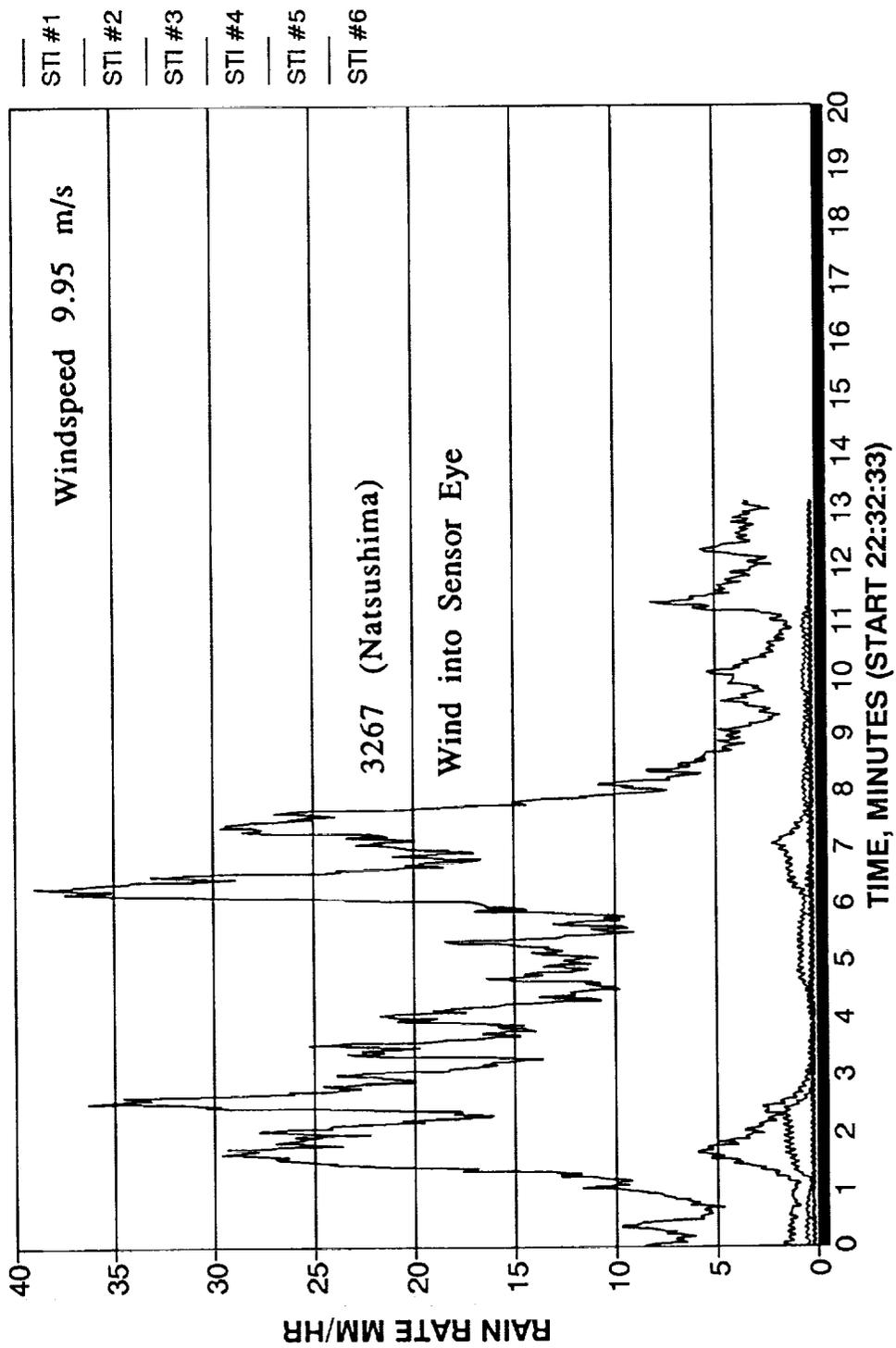
PRC#5, 24 December 1992, {2° 5' S, 155° 15' E}, TOGA/COARE IFA



RV Franklin, mini-ORG #3271, 5 sec. rainfall rates



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# Natural Rain Events at the NASA/Wallops Flight Facility

